"An ounce of prevention is worth a pound of cure"
Henry de Bracton's *De Legibus* (c. 1240)

The concept of **pollution prevention (P2)** is like the old proverb: reduce pollution and waste right at the source so you don't have to deal with it later when it impacts the environment. Pollution prevention can save money, save resources and improve economic efficiencies.

Pollution Prevention (P2) – *The use of processes, practices, materials and energy that avoid or minimize the creation of pollutants and wastes at source*

Pollution prevention makes sense for many reasons. For most companies, waste is a sign of inefficient processes that can mean higher costs and fewer profits. Reducing waste at the source has the benefits of being good for the environment, employees, neighbours and the economy. As an example, eliminating the use of a toxic cleaner means that company employees and the neighbouring community are not at risk to exposure from a toxic substance. In this case, the company saves money that might otherwise have had to be spent on safety training and equipment, emergency response planning and liability insurance.

For companies, pollution prevention fits well with the concept of continuous improvement. A continual review of operations and processes can help a company identify opportunities for the ongoing reduction of waste and efficiency improvements. Pollution prevention is also consistent with industry initiatives such as adopting environmental management systems and the development of best management practices.

The main focus of P2 programs is in industry, but there are opportunities for municipalities, institutions, commercial operations and individuals to practice pollution prevention. Pollution prevention is consistent with good personal environmental practices.

Alberta Environment

Pollution Prevention Basics

Traditionally, we have **reacted** to pollution after it has been released. Pollution or waste created by an industrial process was thought of as unavoidable. If treatment, disposal or cleanup of pollution occurred, these activities were considered as a cost of doing business.

React – *responding to a stimulus or situation*

Figure 1: Environmental Management Hierarchy

The approach to pollution prevention generally focuses on the upper half of the environmental management hierarchy illustrated in Figure 1. The focus shifts from prevention to control as actions progress down. In pollution prevention, you try to put as much effort as possible into the actions in the upper half of the diagram.

Proactive – *Acting in advance to deal with an expected difficulty*

Pollution prevention is a **proactive** approach. Pollution prevention techniques and practices focus on:

- *Identifying substances of concern.* Proper planning can identify materials ahead of time that may cause problems.
- *Materials and feedstock substitution* involves replacing materials in a production process with less polluting or non-polluting substances.

- *Operating efficiencies and training* can provide effective ways to prevent pollution. Examples include:
    - Changing production schedules to minimize equipment and feedstock changeovers
    - Improving maintenance schedules
    - Segregating useable by-products from waste at the source
    - Training staff to improve material handling to avoid spills, contamination and spoilage and to recognize P2 opportunities.
- *On-site reuse and recycling* is considered pollution prevention because it occurs at the same place as the original activity[i]. Raw materials, chemicals and treated and untreated wastewater are examples of materials that could be **reused** or **recycled**. Some examples of on-site reuse and recycling are:
    - Recovering, renewing and reusing lubricating oils on-site
    - Reusing cooling water
    - Recycling trim and cuttings from plastic moulding in on-site production rather than taking them for off-site disposal
- *Purchasing practices* can be a vital part of pollution prevention.
    - Selecting products that have minimum packaging or packaging that can be reused by the vendor
    - Purchasing products that are biodegradable
    - Look for products that meet environmental guidelines, such as **EcoLogo** certified products
    - Ensuring that environmental concerns are factored into all purchases
- *Product design and reformulation* includes methods for preventing pollution associated with the entire life cycle of a product or service. Addressing environmental concerns at an early stage can avoid environmental impacts throughout the product life cycle in a cost-effective manner. Waste can also be viewed as a loss of valuable process materials that could have economic and environmental benefits if they were reused or recycled. Results of redesigning or reformulating a product include:
    - Reducing the toxicity of a product
    - Reducing waste material
    - Extending the life of a product
    - Extending the life of the materials used
    - Reducing energy and material intensity needed to produce, use and dispose of the product

Reuse - *using materials again in their original form or in new applications.*
Recycling - *reprocessing materials so they can be remanufactured.*

EcoLogo - *products and services certified as environmentally friendly under the Canadian Environmental Choice program..*

[i] Off-site reuse or recycling is also an environmentally friendly activity but is often not considered pollution prevention because it deals with the management, transport, treatment and disposal of pollution or wastes after they have been created.

- *Equipment modifications and process changes* may improve efficiencies or reduce pollution or waste by applying new technologies or approaches to existing processes or practices. For example:
    - Using mechanical stripping instead of using solvents to remove paint and varnish
    - Improving insulation on heating or cooling devices to save energy
    - Installing high efficiency burners where appropriate
    - Improving thermostatic controls
    - The use of long-life coolants to avoid the frequent flushing of systems

Common Components of Pollution Prevention Plans

Pollution prevention initiatives vary according to the facility and problem being addressed. However, most successful P2 initiatives have several common features:

- Commitment from the top of the organization
- Baseline review (review of the current situation)
- Identifying P2 opportunities
- Choosing the most appropriate opportunities
- Setting targets
- Implementation
- Monitoring and review

Industrial/Institutional P2 Activities - Success Stories

The web site for the Canadian Pollution Prevention Information Clearing House, http://www.ec.gc.ca/pp/index.cfm, gives examples of success stories in different industry sectors. Although most P2 activities are facility specific there are several sectors for which there is more than one success story. Pollution prevention practices in one facility can address problems common to an entire industry.

Pulp mills in western Canada have made significant efforts to reduce the use of bleaching chemicals in their processes and have managed to reduce the volumes of effluent discharged to water bodies.

Hospitals and other health care institutions practice pollution prevention. They replace thermometers and blood pressure machines that use mercury with digital devices that are more durable and contain no toxic materials.. New facilities have taken advantage of opportunities to incorporate water conservation and energy efficiency into their design.

Oil companies in Alberta have made commitments to reduce flaring and venting, thereby reducing releases of pollutants to the air.

Hotels, motels and other accommodation providers encourage their guests to reuse linen rather than have towels and beds changed every day. This saves water, energy consumption and reduces the amount of detergent released to the environment. The Green Leaf program of TerraChoice http://www.terrachoice.ca/hotelwebsite/indexcanada.htm is an example of how the accommodation industry is working on pollution prevention. People can help support the program by looking for accommodations that are Green Leaf certified.

Many trade or industrial associations actively promote P2 among their members. Members look for ways to reduce the use of toxic chemicals and to reduce waste. The members also encourage, or may require, their suppliers to use positive environmental practices. Various methods (product substitution, process modifications and staff training) are used to achieve the reductions. Some associations promote the use of comprehensive Environmental Management Systems, including P2, among their members.

How Individuals Can Practice Pollution Prevention

It is not only companies that can benefit from pollution prevention. Individuals also have many opportunities. Pollution prevention by individuals is usually achieved by changing the way that one uses products and resources. Energy efficiency and water conservation are two common ways to reduce pollution. Other ways include purchasing items that do not use excess packaging.

Transportation choices allow people to eliminate or reduce pollution. Choosing public transit is a way to reduce emissions. When purchasing a vehicle, choosing a fuel-efficient one will help prevent pollution and save money. Regular maintenance, proper tire inflation and removing roof racks when not needed will also reduce vehicle pollution.

There are many opportunities to practice energy efficiency at home. Turning down your thermostat and installing insulation are two examples. Purchasing energy efficient appliances is another. Changing furnace and air conditioning filters regularly will help your equipment last longer and improve indoor air quality. Each of these activities saves money in the long run and helps our environment.

Pollution prevention is a practice that makes sense for individuals, companies, communities and our environment.

References

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